

On the genus Charagia of Walker,

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THE Catalogue of the *Lepidoptera Heterocera* contained in the British Museum characterizes in page 1569, the genus *Charagia*, to which generic description is appended a Synopsis of the species known to Mr. Walker; the arrangement being apparently founded on the colour and marking of the superior wings, without taking into due consideration the probability of the existence of any of those striking sexual dissimilarities in both of these respects, which this group, particularly in the smaller kinds, so forcibly exhibits.

As this Synopsis, when applied to the species of the genus, enumerated in the catalogue, and to those additional ones in my collection, now to be described, conveys an erroneous principle, I am desirous of contributing further information than I have already given in the *Australian Lepidoptera*, on this beautiful, but little known, portion of the Hepialidean family, and I therefore gladly avail myself of this opportunity to place in a concise manner before the members of this Society the practical knowledge I possess of the transformations, sexual distinctions, and habits of the Australasian *Charagiæ*, in the hope by so doing that a clearer and more accurate perception of this restricted genus might be attained.

Genus CHARAGIA.¹

Charagia. Walker; *Brit. Mus. Cat. Lep. Het.*, p. 1569; *Scott. Aust. Lep.*, p. 3.
Hepialus. Lewin, *Doubleday, Boisduval*; *Stephen's M.S.S.*

Alæ longæ, sat latæ, leviter falcatæ, apice acuminatæ; angulis analibus valde rotundatis.² Caput porrectum. Oculi magni, prominuli. Antennæ brevissimæ, aliquantulum moniliformes, leniter ciliatæ. Palpi labiales distincti, porrecti, triarticulati.

¹ Generic characters copied from my work on Australian Lepidoptera, p. 3.

² Alæ posticæ non semi-hyalinæ. *Brit. Mus. Cat.*, p. 1548.

Maxillæ obsoletæ. Abdomen elongatum, alas posticas superans, lateraliter modice compressum, omnibus partibus ejusdem magnitudinis, apice flabellatum. Pedes excalcariti,¹ anteriores magni, validi, tibiis tarsisque dense pilosis; postici parvi, graciles, tibiis hirsutis, in maribus externe scopatis; tarsi 5-articulatis, fere glabris. Larva carnosâ, cylindrica, ad caput incrassata; capite segmentoque anteriori corneis; in ligno habitans, plerumque librivora. Pupa lactiflora, antice squamosa, postice mollis, elongata, annulis serratis.

Wings long, moderately broad, slightly falcate, pointed at the tips and much rounded at the hinder angles. Head projecting. Eyes large and prominent. Antennæ minute, somewhat moniliform, delicately ciliated. Labial palpi distinct, porrected in front, 3-jointed. Maxillæ obsolete. Body elongated, reaching beyond the wings, slightly flattened laterally, nearly of an equal thickness throughout, with the extremity fan-shaped. Legs spurless,¹ anterior and second pairs large and powerful; tibiæ and tarsi densely pilose; posterior pairs, small, weak, with long hairs on the tibiæ, forming in the males a large brush exteriorly; tarsi 5-jointed, almost naked. Larva fleshy, elongated, cylindrical, stoutest anteriorly, with head and first segment horny; living in the interior of trees and subsisting principally upon the bark. Chrysalis yellowish-white, anterior portion squamose, abdominal, soft and elongated with serrated corneous rings.

Mas... Alæ anticæ virideo argentes, nonnunquam aureo, fasciatæ.

Alæ posticæ subcæruleæ.

<i>Foem..</i> Alæ anticæ virides ferrugineo	}	virescens, <i>Doubleday.</i>
fasciatæ		Scotti, <i>Ramsay.</i>
Alæ anticæ virides argenteo	}	lignivora, <i>Lewin.</i>
fasciatæ		Ramsayi, <i>Scott.</i>
Alæ anticæ purpureæ viridi variæ		scripta, <i>MacLeay.</i>
Alæ posticæ rubicundulæ.		eximia? <i>Scott.</i>
		Lewinii, <i>Stephens.</i>
		splendens, <i>Scott.</i>

¹ Mr. Walker, in the British Museum Catalogue, p. 1569, states that the hind tibiæ have two very minute apical spurs; these have been repeatedly looked for, but hitherto unsuccessfully.

The larvæ excavate to some little depth, cylindrical cells in the interior of the stems or branches of several species of indigenous plants, in which they wholly pass their lives and undergo all the primary changes. Over the external entrance of this habitation they construct a covering, composed of triturated portions of bark and wood held together by silken threads; the edges of which are closely adherent to the branch, and thus leave no opening for the egress or ingress of the animal. In this particular, the protective covering, although similar in construction and general appearance, differs materially from that formed by the caterpillars of the *Cryptophaseæ*, where the lower portions are left unattached to afford to the insects a free passage in order to obtain their natural food, the leaves of the tree within the stems of which they are located. At first, this covering is but a speck, but by the time the larvæ have attained maturity, it assumes an inflated bag-like form of considerable dimensions, and which, in many instances, is so large that the smaller plants are destroyed by the bark having been eaten completely round the main stem.

The chrysalis is placed within this dwelling, head upwards, and, being provided with serrated corneous abdominal rings, and considerable vitality, is capable of locomotion, a power it exercises frequently by moving up and down the walls of its cell with alacrity. At the last metamorphosis, the anterior half of the chrysalis is thrust out of the aperture, when the skin rends asunder, and the perfect insect departs, leaving the exuvie remaining in that position.

The perfect insects are about the most beautiful of the nocturnal Lepidoptera; but unfortunately the colours fade quickly after death; and it is difficult to imagine that the specimens we meet with in cabinets, were ever the beings so brilliant at their births; consequently no adequate idea can be formed of the beauty of the various species of this group, nor correct descriptions given of the colouring, unless by the examination of very recent specimens. These moths are nocturnal in their habits, and fly with great velocity.

1.—CHARAGIA VIRESCENS.

Charagia virescens. *Brit. Mus. Cat. Lep. Het.*, p. 1569.

Charagia rubroviridans. *Brit. Mus. Cat. Lep. Het.*, p. 1570.

Hepialus rubroviridans. *Stephens M.S.S.*

Hepialus virescens. *Doubleday (Duffenbach's New Zealand.)*

Male.....length of wings 49 lines : of body 26 lines¹.

Superior wings, lovely bluish green, relieved by various silver markings, which consist of:—a line along the basal portion of the costa; an irregular broadish obliquely transverse band a little beyond the middle; another semicircular one nearer to the base, with numerous others, small and faint, disposed transversely between the nervures and terminating in lunules at the exterior border.

Inferior wings, delicate bluish-white.

Abdomen and thorax bluish-green. *Eyes* reddish-brown. *Antennæ* tawny.

Female.....length of wings 62 lines : of body 28 lines.

Superior wings, bright green with numerous distinct irregular reddish-brown bands and lines mostly disposed transversely. The costa is barred with green and brown, and the whole wing edged by reddish-brown, the exterior portion being indistinctly scalloped.

Inferior wings, pale purplish-red.

Abdomen purplish red, becoming green towards the extremity. *Thorax* green. *Eyes* and *Antennæ* similar in colour to those of the Male.

Larvalength at maturity about 37 lines, is throughout of a pale ochreous tint, with the squamose portions much darker, and the head black-brown.

These caterpillars were found in great abundance near the town of Auckland by my friend Mr. Edward Ramsay, of Dobroyde, near Sydney, when on a visit to New Zealand.

They inhabited the limbs of various trees, and on the stem

¹ 12 lines to the English inch.

of one of them, the *Melicytus ramiflorus*, or, "Mahoc" of the natives, there were no less than thirty habitations of this species "literally" as he remarked "studded with their abodes."

I feel fully assured that the *Charagia virescens* and the *Charagia rubroviridans* of the Brit. Mus. Cat., pp. 1569 and 1570, are the male and female of the one species.

2.—CHARAGIA LIGNIVORA.

Charagia lignivora. *Brit. Mus. Cat. Lep. Het.*, p. 1570. *Scott's Aust. Lep.*, p. 5, pl. 2.

Hepialus lignivora. *Lewin. Lep. Ins. New South Wales*, pl. 16.

Male.....Length of wings 24 lines : of body 15 lines.

Superior wings, vivid emerald green, occasionally yellowish, adorned by a continuous rather broad silver band, running from the base along the costa, to about $\frac{4}{5}$ ths of its length ; then transversely across the wing to the posterior border, from which it proceeds towards the half of the discoidal cell, and again returns to the interior margin near its base, thus forming in its course a somewhat triangular figure of bright silver over the bed of green.

Inferior wings, pale bluish, inclining to a greenish hue ; towards the tips are two short indistinct bars, slightly yellowish.

Head and Collar yellowish white : *tufts* on the thorax emerald-green. *Abdomen*, upper part greenish white, central delicate purple, and terminal emerald green.

Female..... length of wings 31 lines : of body 18 lines.

Superior wings bright light green over which are delicate irregular lines of scarlet, those under the costa and across the wing a little beyond the middle, are much the most distinct. The outer angle and the interior portion of the base of the wing, are both occupied largely by deep purplish-red, each of these patches relieved by spots of lighter and brighter colour placed within them.

Inferior wings pale yellowish-red.

Body yellowish red; the *tufts* on the abdomen, the *collar*, and the *head* being silver-grey.

Larvaabout 24 lines in length, of a dark cream-colour throughout, with the head and squamose portions darker.

The larvæ inhabit the interior of many plants, such as the Casuarina, Callistemon, Eucalyptus, Dodonæa, Acmena, &c., and are plentifully found within a few miles of Sydney, the lower Hunter River district, and many other localities of New South Wales.

Lewin, in his work on the Lepidopterous Insects of New South Wales, has figured two females, representing them as of different sexes. The correct description of the male of his species, the *lignivora*, is now given.

3.—CHARAGIA LEWINII.

Charagia Lewinii	} <i>Brit. Mus. Cat. Lep. Hct.</i> , p. 1570.
Charagia Lamberti	
Hepialus Lewinii	} <i>Stephen's M.S.S.</i>
Hepialus Lamberti	

Male.....length of wings 21 lines; of body 12 lines.

Superior wings, bright emerald green relieved by various silver markings, namely, a line from the base along the costa to about $\frac{2}{3}$ ths of its length; from this point transversely across the wing to the margin of the inner border, then back towards about half of the discoidal cell, where it nearly meets another short band, proceeding from the basal portion of the interior margin, thus having formed an almost right angle immediately under the discoidal cell: within the space embraced by the two latter bands are placed two small transverse marginal streaks, and likewise over the outer angle a distinct spot is seen. These silver markings are brought out in strong relief by a shading of purplish brown.

The disposition of the silvery lines and colour of the

wings assimilate greatly to those of the *Ch: lignivora*, but are infinitely more slender and delicate.

Inferior wings, pale bluish assuming a purplish tinge towards the anterior border.

Femalelength of wings 24 lines ; of body 14 lines.

Superior wings, bright rich purple ; a large green band on the middle, deeply notched in front ; dilated and angular behind.

Inferior wings, pale rich purple.

The *body* in colour throughout, similar to the wings, but darker towards the lower extremities.

Larvain length about 19 lines ; is of a cream-colour, slightly pinkish in parts ; the head is black-brown, and the squamose portions pale reddish-brown.

The larvæ are common in the vicinity of Sydney, usually occupying the main stems of the small saplings of the casuarinæ.

The *Charagia Lamberti* of the Brit. Mus. Cat. is the male of this species, for which we have retained the name of *Lewin*, originally bestowed on the female insect by *Mr. Stephens*.

4.—CHARAGIA SPLENDENS.

Charagia splendens. *Scott, Aust. Lep., p. 6., pl. 2.*

Malelength of wings 26 lines : of body 15 lines.

Superior wings, bright yellowish green, mottled with darker, and gaily adorned by numerous complicated markings. A continuous band of silver proceeds along the costa to about $\frac{2}{3}$ rds of its length, crosses the wing a little beyond the middle to its inner margin, thence towards the base in a zig-zag manner, forming in this latter course a couple of distinct angles. Two silver bands, connected at their upper ends by a curve, run parallel to the exterior margin, and between these and the first described transverse band are two others of a bright, light, silvery-bluish green. On the centre of the wing is placed conspicuously a rather large V shaped figure, also of bright bluish-green.

Inferior wings, lustrous bluish white.

Thorax green; *head*, *collar*, and *tufts* on thorax silvery. *Abdomen* bluish white, with an oblong green stripe towards the extremity.

Femalelength of wings 33 lines : of body 20 lines.

Superior wings, the centre occupied by a large triangular shaped patch of vivid light satin green, deepening exteriorly, whose lower angle reaches the margin of the inner border, and whose basal portion immediately under the costa, bears three distinct notches. The apical angle to about half of the exterior margin also displays a broad mark of the same intense green possessing a deep indentation on the inner side. With the exception of a distinct spot of green near the outer angle and two others adjoining the base, the remaining portions of the wing are of a deep rich purple.

Inferior wings, pale purplish red, becoming darker towards the hind angle.

Head and *thorax*, reddish brown; *abdomen*, pale purplish red, deepening towards the extremity.

Larvais much larger, but in other respects similar to that of the *Ch: lignivora*, and these two species occupy in common the plants before enumerated.

We may remark that subsequent to the foregoing descriptions, much larger and finer specimens have been obtained.

5.—CHARAGIA RAMSAYI

Male.....length of wings 51 lines : of body 27 lines.

Superior wings, light satiny emerald green, adorned with various large silvery spots, edged around by black-brown, sparingly disposed along the costa and in an oblique transverse row a little beyond the middle. Three small marginal lunules near the outer angle, two small oval spots on the discoidal cell, a dental marking towards the base of interior margin, and between these two latter, a much curved irregular line,—all of silver.

Inferior wings, bluish, slightly yellowish towards the tip.

The *body* pale emerald green with two large spots of silver on the lower part of the thorax; *tufts* of hair on upper parts of abdomen, silvery; *eyes* purplish.

Femalelength of wings 66 lines: of body 33 lines.

Superior wings bright grass green, relieved by large, very bright silver spots brought out in strong relief by an edging of black brown, disposed in a similar manner to those on the male; but being larger and brighter they are more conspicuous and striking. The curved line, before described, becomes here a large spot.

Inferior wings yellowish-red.

Body and *head* similar in colour, but paler, to the superior wings, bearing two reddish-spots on the thorax; the *tufts* on the abdomen are yellowish-red, and the *fan-shaped* extremity purplish.

Larvalength about 42 lines: creamy-white throughout except the segments over the true feet and the head, which are yellowish-brown; pinkish annular lines, also, between each segment.

The larvæ live within the stems of the acmena, alectryon, and a few other plants, and were by no means uncommon on Ash Island, Hunter River, when I resided there.

6.—CHARAGIA SCRIPTA.

Charagia scripta. W. MacLeay, M.S.S.

Malelength of wings 35 lines: of body 18 lines.

Superior wings, basal moiety emerald green, exterior moiety lustrous yellowish-green, separated from each other by an oblique transverse band of silver, scalloped within; the whole surface adorned with numerous labyrinthic silvery lines and bands. The inner half is thickly studded over with short lines of silver, principally disposed transversely; the other by three bands, also of silver, which run parallel to the exterior margin; the outer one assuming a chain-

like pattern: the exterior marginal border is likewise deeply silvered.

Inferior wings bluish-white.

Thorax and *head* emerald green; *eyes* purplish; *abdomen* bluish-white, with silvery tufts.

Female.....length of wings 48 lines; of body 26 lines.

Superior wings bright grass-green with numerous intricate markings of much lighter colour, principally on the basal half. Two oblique transverse rows, beyond the disc, of large bright spots of silver, each one placed between the veins, with the exception that in the external row, between the 2nd and 3rd median nervules no spot exists, and also three or four others which adjoin the exterior angle, these, together with a tooth-shaped marking nearer to the base, and the delicate silver lines across the costa, complete the ornamentation of the upper wings of this peculiarly handsome insect.

Inferior wings yellowish-red inclining to pale yellowish-green towards the tips.

Head, *thorax* and *abdomen* bright green; *tufts* of yellowish-red hairs cover the upper portion of the abdomen, excepting the three ultimate segments: the *fan-shaped extremity* is also furnished with similar reddish hairs.

Several chrysalids in the wood were brought from King George's Sound, Western Australia, in 1861, for W. MacLeay, Esq., of Elizabeth Bay; and in whose collection the perfect insects are; from these specimens the foregoing description has been taken.

7.—CHARAGIA SCOTTI. ♀

Charagia Scotti. ♀ *Ramsay, M.S.S.*

Female.....length of wings 54 lines: of body 26 lines.

Superior wings bright grass-green, delicately dotted over with purplish-brown spots: a slight purplish-brown transverse band beyond the middle.

Inferior wings yellowish-red, paler towards the tips.

This insect was captured by Mr. Ramsay at Lismore, Richmond River, and the plumage much injured before it reached me. In this locality Mr. Ramsay found the caterpillars in abundance infesting, among other plants, the nettle tree, (*urtica gigas*) the native *Wistaria*, &c., &c., but I regret to say, that the several he had so carefully collected, were all destroyed while in their transit to Sydney.

8.—*CHARAGIA EXIMIA*. ♂

Male.....length of wings 36 lines : of body 20 lines.

Superior wings bright emerald-green, chastely relieved with numerous markings ; a transverse oblique band of gold a little beyond the middle, but not reaching to either margin ; many short, curved lines of bright silver disposed between the veins ; those to the exterior of the transverse band form a chain-like pattern ; while those to the interior are irregular and labyrinthic.

Inferior wings bluish with a slight shade of green ; ciliae round the outer angle, golden-brown.

Head pro-thorax and *tippets* similar in colour to the fore wings ; *thorax* and *abdomen* to the hind wings ; *eyes* and *antennæ* dark purplish-brown.

Larva.....length about 42 lines, slightly setigerous, creamy-white with a tinge of purplish-red between the segments.

These larvæ inhabited the small stems and branches of the *Dodonæa angustifolia*, and were found at Ash Island plentifully. All the larvæ we had collected, excepting the one, were lost, arising from the want of proper and sufficient nutriment, the pieces of wood, in which they were, having become from long keeping hard and sapless. The above measurement was taken from one of the finest caterpillars, with which the rearing proved unsuccessful ; the perfect insect, therefore, whose dimensions are given above, is evidently much undersized, and would probably reach, under favourable circumstances, to between 50 and 55 lines.

The more than usually falcate wings ; the band on the fore wing and the brush of hair on the tibiæ of the posterior leg, being of a golden colour ; and the somewhat setigerous larva will readily distinguish this species from any of the foregoing.